

CLAIMS

What is claimed is:

1. A memory package comprising:

5 a plurality of vertically stacked ball grid arrays, wherein each of the plurality of
ball grid arrays comprises a plurality of non-metal mateable alignment
features, and wherein each of the plurality of ball grid arrays is coupled to
another of the plurality of ball grid arrays; and
a plurality of memory chips, wherein each of the plurality of memory chips
10 coupled to a respective one of the plurality of ball grid arrays.

2. The memory package, as set forth in claim 1, wherein each of the plurality of
packages comprises a molded resin body having a die side and a ball side.

15 3. The memory package, as set forth in claim 2, wherein the molded resin package
comprises:

a plurality of first mateable alignment features on the die side of the ball grid
array; and
a plurality of second mateable alignment features on the ball side of the ball grid
20 arrays.

4. The memory package, as set forth in claim 3, wherein the plurality of first mateable alignment features are male and the plurality of second mateable alignment features are female.

5 5. The memory package, as set forth in claim 3, wherein the plurality of first mateable alignment features are male and the plurality of second mateable alignment features are male.

10 6. The memory package, as set forth in claim 3, wherein the plurality of first mateable alignment features are female and the plurality of second mateable alignment features are male.

15 7. The memory package, as set forth in claim 3, wherein the plurality of first mateable alignment features are female and the plurality of second mateable alignment features are female.

20 8. The memory package, as set forth in claim 3, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features orient adjacent ball grid arrays in a unique location.

9. The memory package, as set forth in claim 8, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features are arranged asymmetrically.

5 10. The memory package, as set forth in claim 8, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features comprising of at least one unique alignment feature.

10 11. The memory package, as set forth in claim 3, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features support adjacent ball grid arrays during solder ball reflow.

12. The memory package, as set forth in claim 1, wherein each of the plurality of ball grid arrays is electrically coupled to another of the plurality of ball grid arrays using solder balls.

15 13. The memory package, as set forth in claim 12, wherein each of the plurality of ball grid arrays comprise vias extending therethrough to electrically connect solder balls of adjacent memory packages serially.

20 14. A device comprising:
a chip; and
a package operatively coupled to the chip, the package comprising:

a die side;
a ball side configured to receive a plurality of conductive balls;
a plurality of first non-metal mateable alignment features on the die side of
the package; and
5 a plurality of second non-metal mateable alignment features on the ~~second~~
ball side of the package.

15. The device, as set forth in claim 14, wherein the package comprises a molded
resin body.

10 16. The device, as set forth in claim 14, wherein the plurality of first mateable
alignment features are male and the plurality of second mateable alignment features are female.

15 17. The device, as set forth in claim 14, wherein the plurality of first mateable
alignment features are male and the plurality of second mateable alignment features are male.

18. The device, as set forth in claim 14, wherein the plurality of first mateable
alignment features are female and the plurality of second mateable alignment features are male.

20 19. The device, as set forth in claim 14, wherein the plurality of first mateable
alignment features are female and the plurality of second mateable alignment features are female.

20. The device, as set forth in claim 14, wherein the chip comprises a memory chip.

21. The device, as set forth in claim 14, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features are arranged asymmetrically.

22. A package comprising:

a die side configured to receive a die;

a ball side configured to receive a plurality of conductive balls;

a plurality of first non-metal mateable alignment features on the die side of the package; and

a plurality of second non-metal mateable alignment features on the ball side of the package.

23. The package, as set forth in claim 22, wherein the package comprises a molded resin body.

24. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features are male and the plurality of second mateable alignment features are female.

25. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features are male and the plurality of second mateable alignment features are male.

26. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features are female and the plurality of second mateable alignment features are male.

5 27. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features are female and the plurality of second mateable alignment features are female.

28. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features orient adjacent
10 packages in a unique location.

29. The package, as set forth in claim 28, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features are arranged
15 asymmetrically.

30. The package, as set forth in claim 28, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features comprising of at least
one unique alignment feature.

20 31. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features support adjacent packages during solder ball reflow.

32. The package, as set forth in claim 22, wherein the plurality of first mateable alignment features and the plurality of second mateable alignment features are arranged asymmetrically.